

What is claimed is:

1. An electrosurgical assembly which interfaces with a generator for executing a first electrosurgical procedure and which comprises:

an output assembly which is at least operatively interconnectable with said generator;

5 an active electrosurgical element which is operatively interconnected with said output assembly and which interacts with a first portion of a patient during said first electrosurgical procedure;

a return path element which interacts with a second portion of said patient during said first electrosurgical procedure and which is mechanically interconnected with said active electrosurgical
10 element to define a bipolar configuration, wherein said first and second portions are different, and wherein said return path element comprises a first dielectric component which interfaces with said patient; and

a return assembly which is operatively interconnected with said return path element and further which is at least operatively interconnectable with said generator.

15 2. An electrosurgical assembly, as claimed in Claim 1, wherein:

said generator comprises an outlet connector and a return connector, said output assembly comprises an output plug which is detachably interconnectable with said output connector and an output line which is disposed between said output plug and said active electrosurgical element, and said return assembly comprises a return plug which is detachably interconnectable with said return
20 connector and a return line which is disposed between said return plug and said return path element.

3. An electrosurgical assembly, as claimed in Claim 1, wherein:

said active electrosurgical element comprises at least one active electrode, wherein each said electrode has at least one patient interface surface, and wherein each said patient interface surface is selected from the group consisting of a curved surface and a flat surface.

5 4. An electrosurgical assembly, as claimed in Claim 1, wherein:

said active electrosurgical element is selected from the group consisting of one or more blades, hooks, balls, spatulas, loops, pins, wireforms, tubes, and tubes with fluid passageways.

5. An electrosurgical assembly, as claimed in Claim 1, wherein:

10 said first dielectric component comprises a first material having a dielectric product greater than about 2,000, wherein said dielectric product is a dielectric constant of said first material, multiplied by a dielectric strength of said first material.

6. An electrosurgical assembly, as claimed in Claim 5, wherein:

said first material is selected from the group consisting of alumina, diamond, boron nitride, polyimide, polyester, parylene, barium titanate, titanium dioxide, Teflon, and polycarbonate.

15 7. An electrosurgical assembly, as claimed in Claim 1, wherein:

said first dielectric component comprises a first material having a dielectric product greater than about 4,000, wherein said dielectric product is a dielectric constant of said first material, multiplied by a dielectric strength of said first material.

8. An electrosurgical assembly, as claimed in Claim 1, wherein:

said first dielectric component comprises a first material having a dielectric product greater than about 8,000, wherein said dielectric product is a dielectric constant of said first material, multiplied by a dielectric strength of said first material.

5 9. An electrosurgical assembly, as claimed in Claim 1, wherein:

said first dielectric component comprises a first material having a dielectric constant greater than about 10.

10. An electrosurgical assembly, as claimed in Claim 9, wherein:

10 said first material is selected from the group consisting of ceramics, alumina, titanium dioxide, barium nitrate, and any combination thereof.

11. An electrosurgical assembly, as claimed in Claim 1, wherein:

said first dielectric component comprises a first material having a dielectric constant greater than about 20.

12. An electrosurgical assembly, as claimed in Claim 1, wherein:

15 said first dielectric component comprises a first material having a dielectric constant greater than about 50.

13. An electrosurgical assembly, as claimed in Claim 1, wherein:

said first dielectric component comprises a mixture of first and second materials.

14. An electrosurgical assembly, as claimed in Claim 1, wherein:

20 an impedance of said return path element is less than about 800 ohms.

15. An electrosurgical assembly, as claimed in Claim 1, wherein:
an impedance of said return path element is less than about 500 ohms.

16. An electrosurgical assembly, as claimed in Claim 1, wherein:
an impedance of said return path element is less than about 300 ohms.

5 17. An electrosurgical assembly, as claimed in Claim 1, wherein:
an impedance of said return path element is less than about 200 ohms.

18. An electrosurgical assembly, as claimed in Claim 1, wherein:
said return path element further comprises a first return conductor which interfaces with said
first dielectric component in such a manner that energy is returned to said generator first through said
10 first dielectric component and then to said first return conductor, and wherein a wall thickness of said
first dielectric component is less than about 0.025 inches.

19. An electrosurgical assembly, as claimed in Claim 1, wherein:
said return path element further comprises a first return conductor which interfaces with said
first dielectric component in such a manner that energy is returned to said generator first through said
15 first dielectric component and then to said first return conductor, and wherein a wall thickness of said
first dielectric component is no more than about 0.010 inches.

20. An electrosurgical assembly, as claimed in Claim 1, wherein:
said return path element further comprises a first return conductor which interfaces with said
first dielectric component in such a manner that energy is returned to said generator first through said
20 first dielectric component and then to said first return conductor, and wherein a wall thickness of said
first dielectric component is no more than about 0.005 inches.

21. An electrosurgical assembly, as claimed in Claim 1, wherein:

said first dielectric component withstands voltages exceeding 1,000 volts peak to peak.

22. An electrosurgical assembly, as claimed in Claim 1, wherein:

said first dielectric component withstands voltages exceeding 2,000 volts peak to peak.

5 23. An electrosurgical assembly, as claimed in Claim 1, wherein:

said first dielectric component withstands voltages exceeding 5,000 volts peak to peak.

24. An electrosurgical assembly, as claimed in Claim 1, wherein:

said return path element comprises a capacitor.

25. An electrosurgical assembly, as claimed in Claim 1, wherein:

10 said return path element further comprises a first return conductor which interfaces with said first dielectric component in such a manner that energy is returned to said generator first through said first dielectric component and then to said first return conductor, wherein said first return conductor comprises a tube, and wherein said first dielectric component is annularly disposed about an end portion of said tube.

15 26. An electrosurgical assembly, as claimed in Claim 1, wherein:

said return path element further comprises a first return conductor which interfaces with said first dielectric component in such a manner that energy is returned to said generator first through said first dielectric component and then to said first return conductor, wherein said first dielectric component is defined by a first tube, wherein said first return conductor is defined by a second tube,
20 and wherein said first and second tubes are disposed in end-to-end relation.

27. An electrosurgical assembly, as claimed in Claim 1, further comprising:
an inductor disposed in series with said return path element.

28. An electrosurgical assembly, as claimed in Claim 1, further comprising:
means for offsetting an impedance of said return path element.

5 29. An electrosurgical assembly, as claimed in Claim 1, further comprising:
means for allowing energy transfer from said patient to said electrosurgical generator by
electric fields, wherein said means for allowing comprises said return path element.

30. An electrosurgical assembly, as claimed in Claim 1, wherein:
said second portion of said patient is selected from the group consisting of body tissue and
10 at least one conductive liquid.

31. An electrosurgical assembly, as claimed in Claim 1, wherein:
said electrosurgical assembly comprises a probe, wherein said probe comprises first and
second longitudinal segments, wherein said active electrosurgical element is disposed within said
first longitudinal segment and said return path element is disposed within said second longitudinal
15 segment, wherein said active electrosurgical element is electrically isolated from said return path
element, and wherein said first dielectric component defines a perimeter of said probe along said
second longitudinal segment.

32. An electrosurgical assembly, as claimed in Claim 1, wherein:
a configuration of said electrosurgical assembly allows said first electrosurgical procedure
20 to be selected from the group consisting of cutting, coagulation, desiccation, fulguration, ablation,
and tissue shrinkage.

33. An electrosurgical assembly, as claimed in Claim 1, further comprising:
a shunt circuit between said output and return assemblies.

34. An electrosurgical assembly, as claimed in Claim 1, wherein:
said first dielectric component comprises at least about 50 wt% barium titanate.

5 35. An electrosurgical assembly, as claimed in Claim 1, wherein:
said first dielectric component is in the form of a tube with a wall thickness of no more than
about 0.25 inches and a surface area which is within a range of about 0.007 in² to about 1 in².

36. An electrosurgical assembly, as claimed in Claim 1, wherein:
said first dielectric component is in the form of a tube with a minimum wall thickness that
10 is at least about 0.0005 inch.